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|---|---|
| DEAN, RAYMOND S | |
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| 2684 | |

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. 10/026,677 | Applicant(s) BARAK ET AL. | |
|---|---|---|---|
| | Examiner Raymond S Dean | Art Unit 2684 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *21 October 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1 - 29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 October 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Arguments*

1. Examiner acknowledges the amendments to the drawings therefore the objection to the drawings is withdrawn.

2. Applicant's arguments filed October 21, 2004 have been fully considered but they are not persuasive.

Regarding Claims 1 – 7, Dent teaches a modern day implementation of outphasing modulation. The outphasing modulation method taught by Dent comprises an adaptive method that combines two outphased signals with a variable phase difference such that the phases of said signals add and cancel in phase. The addition and subtraction in phase thus produces an output signal with a varying amplitude (See Column 2 lines 56 – 61, Column 6 lines 66 – 67, Column 7 lines 1 – 4). Nielsen teaches a phase lock loop and an automatic level control loop (See Figure 1, phase lock loop (8), automatic level control loop (16)). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the amplitude feedback loop and phase lock loop taught in Nielsen in the amplifier circuit of Dent for the purpose of improving the phase linearity as well as the amplitude linearity of the amplifiers of Dent thus creating lower levels of spurious signals as taught by Nielsen.

Regarding Claims 8 – 11, Please see the remarks set forth above regarding Dent's teaching. Nielsen teaches first and second control signals that control the

amplitude of an output signal (Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21, Dp and Da are the control signals); and setting phases to signals according to a phase of an envelope signal (Column 7 lines 15 – 44, the signal P has an amplitude and thus an envelope). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the amplitude feedback loop and phase lock loop circuitry taught in Nielsen in the amplifier circuit of Dent for the purpose of improving the phase linearity as well as the amplitude linearity of the amplifiers of Dent thus creating lower levels of spurious signals as taught by Nielsen.

Regarding Claims 22 – 25, Please see the remarks set forth above regarding Dent's teaching. Nielsen teaches a control signal generator to generate first and second control signals according to an adaptive function determined, at least in part, by an instantaneous amplitude of an input signal (Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21, the two control signals are Dp and Da, one of said signals Da is generated according to the amplitude) and a constant envelope signal (Column 6 lines 66 – 67, Column 7 line 1, the amplitude is constant thus there will be a constant envelope). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the amplitude feedback loop, phase lock loop circuitry taught in Nielsen in the amplifier circuit of Dent for the purpose of improving the phase linearity as well as the amplitude linearity of the amplifiers of Dent thus creating lower levels of spurious signals as taught by Nielsen.

Regarding Claims 26 – 29, Please see the remarks set forth above regarding Dent's teaching. Nielsen teaches a control signal generator to generate first and

second control signals according to an adaptive function determined, at least in part, by an instantaneous amplitude of a signal (Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21, the two control signals are Dp and Da, one of said signals Da is generated according to the amplitude). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the amplitude feedback loop and phase lock loop circuitry taught in Nielsen in the amplifier circuit of Dent for the purpose of improving the phase linearity as well as the amplitude linearity of the amplifiers of Dent thus creating lower levels of spurious signals as taught by Nielsen.

Regarding Claims 12 – 15, Please see the remarks set forth above regarding Dent's teaching. Nielsen teaches generating first and second control signals according to properties an adaptive function determined, at least in part, by an instantaneous amplitude of a signal (Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21, the two control signals are Dp and Da, one of said signals Da is generated according to the amplitude). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the amplitude feedback loop and phase lock loop circuitry taught in Nielsen in the amplifier circuit of Dent for the purpose of improving the phase linearity as well as the amplitude linearity of the amplifiers of Dent thus creating lower levels of spurious signals as taught by Nielsen. Alinikula teaches a pre-distorted signal (Figure 2, Column 4 lines 16 – 17, V sub 1 is the pre-distorted signal). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use pre-distortion linearizer taught in Alinikula in the radio

transmitter of Dent in view of Nielsen for the purpose of improving the linearity of the amplifiers thus enabling the elimination of undesired frequency components.

Regarding Claims 16 – 21, Please see the remarks set forth above regarding Dent's teaching. Nielsen teaches a coupler to provide a feedback signal of an output signal to a phase lock loop and an automatic level control loop (Figure 1, Column 7 line 15, Column 7 line 66, the output signals are coupled to the phase lock loop and the amplitude feedback loop through the feedback loops thus there is an inherent coupler to allow said coupling), shared by the phase lock loop and the automatic level control loop (Figure 1, Column 6 lines 6 – 7, Column 6 lines 11 – 14, the signals (I', Q', and A) feed the analog output stage, said analog output stage performs operations on all said signals such that an output signal is generated thus said analog output stage shares all said signals which means that the amplitude feedback loop, which is an automatic level control loop, and the phase lock loop also share said signals as said analog output stage comprises said amplitude feedback loop and said phase lock loop), and transmitting the output signal according to a targeted power level (Column 8 lines 1 – 21, Column 10 lines 27 – 29, the amplitude feedback loop maintains amplitude linearity such that a targeted power level is achieved). Nielsen further teaches wherein a non-shared portion of the automatic level control loop is able to provide first and second control signals (See Figure 1, the automatic level control loop comprises a non shared portion which is the difference element (17), said difference element will produce a plurality of control signals (Da)). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the amplitude feedback loop and

phase lock loop circuitry taught in Nielsen in the amplifier circuit of Dent for the purpose of improving the phase linearity as well as the amplitude linearity of the amplifiers of Dent thus creating lower levels of spurious signals as taught by Nielsen. Wallace teaches a dipole antenna (Figure 6, Column 4 line 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the dipole antenna taught in Wallace on the radiotelephone of Dent in view of Nielsen for the purpose of creating a symmetric radiation pattern thus allowing said radiotelephone to receive and transmit signals from and in all directions.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1 – 11 and 22 – 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dent (6,133,788) in view of Nielsen et al. (US 6,633,199).

Regarding Claim 1, Dent teaches a method comprising: determining based on an adaptive function to vary an amplitude of an output signal by varying either a phase difference between first and second outphased signals or an amplitude of the first and second outphasing signals (Figure 2, Figure 3, Column 2 lines 56 – 61, Column 6 lines 66 – 67, Column 7 lines 1 – 4, Column 7 lines 59 – 67, Column 8 lines 1 – 2, the out-

phased signals are 306 and 308, Dent teaches a modern day implementation of outphasing modulation, the outphasing modulation method taught by Dent comprises an adaptive method that combines two outphased signals with a variable phase difference such that the phases of said signals add and cancel in phase, the addition and subtraction in phase thus produces an output signal with a varying amplitude).

Dent does not teach shared by a phase lock loop and an automatic level control loop.

Nielsen teaches shared by a phase lock loop and an automatic level control loop (Figure 1, Column 6 lines 6 – 7, Column 6 lines 11 – 14, the signals (I', Q', and A) feed the analog output stage, said analog output stage performs operations on all said signals such that an output signal is generated thus said analog output stage shares all said signals which means that the amplitude feedback loop, which is an automatic level control loop, and the phase lock loop also share said signals as said analog output stage comprises said amplitude feedback loop and said phase lock loop).

Dent and Nielsen both teach an amplifier circuit for use in radio transmitters thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the amplitude feedback loop and phase lock loop taught in Nielsen in the amplifier circuit of Dent for the purpose of improving the phase linearity as well as the amplitude linearity of the amplifiers of Dent thus creating lower levels of spurious signals as taught by Nielsen.

Regarding Claim 2, Dent in view of Nielsen teaches all of the claimed limitations recited in Claim 1. Dent further teaches generating the output signal according to the first and second out-phased signals (Figure 3, Column 8 lines 38 - 41).

Regarding Claim 3, Dent in view of Nielsen teaches all of the claimed limitations recited in Claim 2. Dent further teaches controlling an instantaneous amplitude of the output signal by varying either an amplitude or the phase difference between the first and the second outphased signals (Column 2 lines 56 – 61, Column 6 lines 66 – 67, Column 7 lines 1 – 4, Column 7 lines 59 – 67, Column 8 lines 1 – 2, Dent teaches a modern day implementation of outphasing modulation, the outphasing modulation method taught by Dent comprises an adaptive method that combines two outphased signals with a variable phase difference such that the phases of said signals add and cancel in phase, the addition and subtraction in phase thus produces an output signal with a varying amplitude). Nielsen further teaches controlling the amplitude of an output signal according to an amplitude error of the output signal (Figure 1, Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21, the difference (Da) is the amplitude error); and varying a phase of a signal according to a phase error signal of the output signal (Column 7 lines 15 – 44, the difference (Dp) is the phase error).

Regarding Claim 4, Dent in view of Nielsen teaches all of the claimed limitations recited in Claim 3. Nielsen further teaches generating the amplitude error signal and the phase error signal according to an input signal and the output signal (Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21), generating a first control signal of the automatic level control loop according to the amplitude error of the output signal

(Column 7 lines 66 – 66, Column 8 lines 1 – 21, the difference signal (Da) is also the control signal); and generating a second control signal of the automatic level control loop determined, at least in part, by an adaptive function of the amplitude error signal (Figure 2, Column 9 lines 61 – 65, the gain control signal (Ga) is a second control signal that is derived from the difference signal (Da)).

Regarding Claim 5, Dent in view of Nielsen teaches all of the claimed limitations recited in Claim 4. Nielsen further teaches varying the amplitude of a signal with a first range of the amplitude error of the output signal (Column 8 lines 1 – 21); and varying the phase difference of a signal with a second range of the amplitude error of the output signal (Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21, the phase difference (Dp) can vary for any amplitude difference (Da) since the phase is controlled by a separate phase lock loop).

Regarding Claim 6, Dent in view of Nielsen teaches all of the claimed limitations recited in Claim 5. Nielsen further teaches transmitting the output signal at an average power level which is substantially equivalent to a targeted power level (Column 8 lines 1 – 21, Column 10 lines 27 – 29, the amplitude feedback loop maintains amplitude linearity such that a targeted power level is achieved thus the average power level will be equivalent to the desired or targeted power level).

Regarding Claim 7, Dent in view of Nielsen teaches all of the claimed limitations recited in Claim 6. Nielsen further teaches selecting the targeted power level from a first and a second power levels (Column 8 lines 1 – 21, Column 10 lines 27 – 29, the

amplitude feedback loop maintains amplitude linearity thus allowing for various desired power levels to be selected).

Regarding Claim 8, Dent teaches controlling an instantaneous amplitude of an output signal by varying either a phase difference between first and second out-phased signals or an amplitude of the first and second outphased signals (Figure 2, Figure 3, Column 2 lines 56 – 61, Column 6 lines 66 – 67, Column 7 lines 1 – 4, Column 7 lines 59 – 67, Column 8 lines 1 – 2, the out-phased signals are 306 and 308, Dent teaches a modern day implementation of outphasing modulation, the outphasing modulation method taught by Dent comprises an adaptive method that combines two outphased signals with a variable phase difference such that the phases of said signals add and cancel in phase, the addition and subtraction in phase thus produces an output signal with a varying amplitude).

Dent does not teach controlling an instantaneous amplitude of an output signal according to first and second control signals; and setting first and second phases to the first and the second out-phased signals according to a phase of an envelope signal.

Nielsen teaches first and second control signals that control the amplitude of an output signal (Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21, Dp and Da are the control signals) and setting phases to signals according to a phase of an envelope signal (Column 7 lines 15 – 44, the signal P has an amplitude and thus an envelope).

Dent and Nielsen both teach an amplifier circuit for use in radio transmitters thus it would have been obvious to one of ordinary skill in the art at the time the invention

was made to use the amplitude feedback loop and phase lock loop circuitry taught in Nielsen in the amplifier circuit of Dent for the purpose of improving the phase linearity as well as the amplitude linearity of the amplifiers of Dent thus creating lower levels of spurious signals as taught by Nielsen.

Regarding Claim 9, Dent in view of Nielsen teaches all of the claimed limitations recited in Claim 8. Nielsen further teaches generating the envelope signal according to a phase of an input signal (Column 7 lines 15 – 44, the output signal will have an amplitude and thus an envelop); generating the first and the second control signals according to an adaptive function determined, at least in part, on an instantaneous amplitude of the input signal (Column 7 lines 15 – 44, Column 7 lines 66 – 66, Column 8 lines 1 – 21, the two control signals are Dp and Da, one of said signals Da is generated according to the amplitude), an average power level that is substantially equivalent to a targeted power level (Column 8 lines 1 – 21, Column 10 lines 27 – 29, the amplitude feedback loop maintains amplitude linearity such that the targeted power level can be achieved thus the average power level will be equivalent to the desired or targeted power level). Dent further teaches combining the first and the second out-phased signals to provide an output signal (Figure 3, Column 8 lines 38 - 41).

Regarding Claim 10, Dent in view of Nielsen teaches all of the claimed limitations recited in Claim 9. Nielsen further teaches manipulating the instantaneous amplitude of the input signal with the targeted power level, wherein the targeted power level is selected from first and second power levels (Column 8 lines 1 – 21, Column 10 lines 27

– 29, the amplitude feedback loop maintains amplitude linearity thus allowing for various desired power levels to be selected).

Regarding Claim 11, Dent in view of Nielsen teaches all of the claimed limitations recited in Claim 10. Nielsen further teaches varying the amplitude of signals at a first range of the instantaneous amplitude (Column 8 lines 1 – 21, the range is the difference (Da)); and varying the phase difference between signals at a second range of the instantaneous amplitude (Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21, the phase difference (Dp) can vary for any amplitude difference (Da) since the phase is controlled by a separate phase lock loop).

Regarding Claim 22, Dent teaches varying either an amplitude of first and second outphased signals or a phase difference between the first and second outphased signals (Figure 3, Column 2 lines 56 – 61, Column 6 lines 66 – 67, Column 7 lines 1 – 4, Column 7 lines 59 – 67, Column 8 lines 1 – 2, the out-phased signal generator is 330, the out-phased signals are 306 and 308, Dent teaches a modern day implementation of outphasing modulation, the outphasing modulation method taught by Dent comprises an adaptive method that combines two outphased signals with a variable phase difference such that the phases of said signals add and cancel in phase, the addition and subtraction in phase thus produces an output signal with a varying amplitude) and an out-phasing signal generator to generate first and second out-phased signals (Figure 3, Column 6 lines 66 – 67, Column 7 lines 1 – 4, Column 7 lines 59 – 67, Column 8 lines 1 – 2, the out-phased signal generator is 330, the out-phased signals are 306 and 308).

Dent does not teach a control signal generator to generate first and second control signals according to an adaptive function determined, at least in part, by an instantaneous amplitude of an input signal and a constant envelope signal.

Nielsen teaches a control signal generator to generate first and second control signals according to an adaptive function determined, at least in part, by an instantaneous amplitude of an input signal (Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21, the two control signals are Dp and Da, one of said signals Da is generated according to the amplitude) and a constant envelope signal (Column 6 lines 66 – 67, Column 7 line 1, the amplitude is constant thus there will be a constant envelope).

Dent and Nielsen both teach an amplifier circuit for use in radio transmitters thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the amplitude feedback loop and phase lock loop circuitry taught in Nielsen in the amplifier circuit of Dent for the purpose of improving the phase linearity as well as the amplitude linearity of the amplifiers of Dent thus creating lower levels of spurious signals as taught by Nielsen.

Regarding Claim 23, Dent in view of Nielsen teaches all of the claimed limitations recited in Claim 22. Nielsen further teaches a power amplifier to provide an output signal (Figure 1) and to transmit the output signal at an average power level which is substantially equivalent to a targeted power level (Column 8 lines 1 – 21, Column 10 lines 27 – 29, the amplitude feedback loop maintains amplitude linearity such that a

targeted power level is achieved thus the average power level will be equivalent to the desired or targeted power level).

Regarding Claim 24, Dent in view of Nielsen teaches all of the claimed limitations recited in Claim 23. Nielsen further teaches wherein the first and the second control signals are adapted to in combination to vary amplitudes of a signal at a first range of the instantaneous amplitude (Column 8 lines 1 – 21, the range is the difference (Da)) and to vary a phase difference between signals at a second range of the instantaneous amplitude (Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21, the phase difference (Dp) can vary for any amplitude difference (Da) since the phase is controlled by a separate phase lock loop).

Regarding Claim 25, Dent in view of Nielsen teaches all of the claimed limitations recited in Claim 24. Nielsen further teaches manipulating the instantaneous amplitude of the input signal with the targeted power level, wherein the targeted power level is selected from first and second power levels (Column 8 lines 1 – 21, Column 10 lines 27 – 29, the amplitude feedback loop maintains amplitude linearity thus allowing for various desired power levels to be selected).

Regarding Claim 26, Dent teaches a signal generator adapted to generate an envelope signal according to a phase of a baseband signal (Figure 3, Column 7 lines 59 – 67, Column 8 lines 1 – 2, signal generator is 330, I and Q are the baseband signals, the signals 306 and 308 have amplitudes and thus envelopes) and varying either an amplitude of first and second outphased signals or a phase difference between the first and second outphased signals (Figure 3, Column 2 lines 56 – 61, Column 6 lines 66 –

67, Column 7 lines 1 – 4, Column 7 lines 59 – 67, Column 8 lines 1 – 2, the out-phased signals are 306 and 308, Dent teaches a modern day implementation of outphasing modulation, the outphasing modulation method taught by Dent comprises an adaptive method that combines two outphased signals with a variable phase difference such that the phases of said signals add and cancel in phase, the addition and subtraction in phase thus produces an output signal with a varying amplitude)

Dent does not teach a control signal generator to generate first and second control signals according to an adaptive function determined, at least in part, by an instantaneous amplitude of a baseband signal.

Nielsen teaches a control signal generator to generate first and second control signals according to an adaptive function determined, at least in part, by an instantaneous amplitude of a signal (Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21, the two control signals are Dp and Da, one of said signals Da is generated according to the amplitude).

Dent and Nielsen both teach an amplifier circuit for use in radio transmitters thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the amplitude feedback loop and phase lock loop circuitry taught in Nielsen in the amplifier circuit of Dent for the purpose of improving the phase linearity as well as the amplitude linearity of the amplifiers of Dent thus creating lower levels of spurious signals as taught by Nielsen.

Regarding Claim 27, Dent in view of Nielsen teaches all of the claimed limitations recited in Claim 26. Dent further teaches an out-phasing signal generator to

generate the first and second out-phased signals according to the envelope signal (Figure 3, Column 7 lines 59 – 67, Column 8 lines 1 – 2, the out-phased signals (306,308) comprise envelope signals) wherein the first and the second out-phased signals comprise a phase which is provided by the envelope signal (Figure 3, Column 7 lines 59 – 67, Column 8 lines 1 – 2, the out-phased signals (306,308) comprise envelope signals). Nielsen further teaches a variable phase difference and a variable amplitude which varies according to the first and the second control signals (Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21).

Regarding Claim 28, Dent in view of Nielsen teaches all of the claimed limitations recited in Claim 27. Nielsen further teaches a power amplifier which is adapted to provide an output signal at an average power level which is substantially equivalent to a targeted power level (Figure 1, Column 8 lines 1 – 21, Column 10 lines 27 – 29, the amplitude feedback loop maintains amplitude linearity such that the desired power level can be achieved thus the average power level will be equivalent to the desired or targeted power level).

Regarding Claim 29, Dent in view of Nielsen teaches all of the claimed limitations recited in Claim 28. Nielsen further teaches manipulating the instantaneous amplitude of the input signal with the targeted power level, wherein the targeted power level is selected from first and second power levels (Column 8 lines 1 – 21, Column 10 lines 27 – 29, the amplitude feedback loop maintains amplitude linearity thus allowing for various desired power levels to be selected).

5. Claims 12 – 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dent (6,133,788) in view of Nielsen et al. (US 6,633,199) and in further view of Alinikula (5,786,728).

Regarding Claim 12, Dent teaches controlling an amplitude of an output signal by varying, either a phase difference between first and second outphasing signals or an amplitude of the first and the second outphased signals (Figure 2, Figure 3, Column 2 lines 56 – 61, Column 6 lines 66 – 67, Column 7 lines 1 – 4, Column 7 lines 59 – 67, Column 8 lines 1 – 2, the out-phased signals are 306 and 308, Dent teaches a modern day implementation of outphasing modulation, the outphasing modulation method taught by Dent comprises an adaptive method that combines two outphased signals with a variable phase difference such that the phases of said signals add and cancel in phase, the addition and subtraction in phase thus produces an output signal with a varying amplitude).

Dent does not teach generating first and second control signals according to properties of an adaptive function determined, at least in part, by an instantaneous amplitude of a pre-distorted signal.

Nielsen teaches generating first and second control signals according to properties of an adaptive function determined, at least in part, by an instantaneous amplitude of a signal (Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21, the two control signals are Dp and Da, one of said signals Da is generated according to the amplitude), and varying a phase difference and an amplitude of a

signal according to the first and the second control signals (Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21).

Dent and Nielsen both teach an amplifier circuit for use in radio transmitters thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the amplitude feedback loop and phase lock loop circuitry taught in Nielsen in the amplifier circuit of Dent for the purpose of improving the phase linearity as well as the amplitude linearity of the amplifiers of Dent thus creating lower levels of spurious signals as taught by Nielsen.

Dent in view of Nielsen does not teach a pre-distorted signal.

Alinikula teaches a pre-distorted signal (Figure 2, Column 4 lines 16 – 17, V sub 1 is the pre-distorted signal).

Dent in view of Nielsen and Alinikula teach radio transmitters comprising amplifiers thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use pre-distortion linearizer taught in Alinikula in the radio transmitter of Dent in view of Nielsen for the purpose of improving the linearity of the amplifiers thus enabling the elimination of undesired frequency components.

Regarding Claim 13, Dent in view of Nielsen and in further view of Alinikula teaches all of the claimed limitations recited in Claim 12. Nielsen further teaches generating an envelope signal according to a phase of a signal (Figure 1, Column 7 lines 15 – 44, the output signal will have an amplitude and thus an envelope); and varying phases of signals according to the envelope signal (Column 7 lines 15 – 44)

Regarding Claim 14, Dent in view of Nielsen and in further view of Alinikula teaches all of the claimed limitations recited in Claim 12. Dent further teaches combining the first and the second out-phased signals to provide an output signal (Figure 3, Column 8 lines 38 - 41). Nielsen further teaches an average power level which is substantially equivalent to a targeted power level (Column 8 lines 1 – 21, Column 10 lines 27 – 29, the amplitude feedback loop maintains amplitude linearity such that a targeted power level is achieved thus the average power level will be equivalent to the desired or targeted power level). Alinikula further teaches generating the pre-distorted signal to compensate for distortion at the output signal (Figure 2, Column 4 lines 16 – 17, V sub 1 is the pre-distorted signal).

Regarding Claim 15, Dent in view of Nielsen and in further view of Alinikula teaches all of the claimed limitations recited in Claim 14. Nielsen further teaches manipulating the instantaneous amplitude of the input signal with the targeted power level, wherein the targeted power level is selected from first and second power levels (Column 8 lines 1 – 21, Column 10 lines 27 – 29, the amplitude feedback loop maintains amplitude linearity thus allowing for various desired power levels to be selected).

6. Claims 16 – 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dent (6,133,788) in view of Nielsen et al. (US 6,633,199) and in further view of Wallace et al. (6,147,653).

Regarding Claim 16, Dent teaches an out-phased signal generator and a power amplifier (Figure 3, Column 6 lines 66 – 67, Column 7 lines 1 – 4, Column 7 lines 59 –

67, Column 8 lines 1 – 2, the out-phased signal generator is 330, the amplifiers are 312 and 314) and varying either, a phase difference between first and second outphased signals or an amplitude of the first and second outphased signals (Figure 2, Figure 3, Column 2 lines 56 – 61, Column 6 lines 66 – 67, Column 7 lines 1 – 4, Column 7 lines 59 – 67, Column 8 lines 1 – 2, the out-phased signals are 306 and 308, Dent teaches a modern day implementation of outphasing modulation, the outphasing modulation method taught by Dent comprises an adaptive method that combines two outphased signals with a variable phase difference such that the phases of said signals add and cancel in phase, the addition and subtraction in phase thus produces an output signal with a varying amplitude)

Dent does not teach a coupler to provide a feedback signal of an output signal to a phase lock loop and an automatic level control loop, shared by the phase lock loop and the automatic level control loop, a non shared portion of the automatic level control loop is able to provide the outphased signal generator first and second control signals which are in combination, and a dipole antenna to transmit the output signal according to a targeted power level.

Nielsen teaches a coupler to provide a feedback signal of an output signal to a phase lock loop and an automatic level control loop (Figure 1, Column 7 line 15, Column 7 line 66, the output signals are coupled to the phase lock loop and the amplitude feedback loop through the feedback loops thus there is an inherent coupler to allow said coupling), shared by the phase lock loop and the automatic level control loop (Figure 1, Column 6 lines 6 – 7, Column 6 lines 11 – 14, the signals (I', Q', and A) feed

the analog output stage, said analog output stage performs operations on all said signals such that an output signal is generated thus said analog output stage shares all said signals which means that the amplitude feedback loop, which is an automatic level control loop, and the phase lock loop also share said signals as said analog output stage comprises said amplitude feedback loop and said phase lock loop), a non shared portion of the automatic level control loop is able to provide first and second control signals which are in combination (See Figure 1, the automatic level control loop comprises a non shared portion which is the difference element (17), said difference element will produce a plurality of control signals (Da)) and transmitting the output signal according to a targeted power level (Column 8 lines 1 – 21, Column 10 lines 27 – 29, the amplitude feedback loop maintains amplitude linearity such that a targeted power level is achieved).

Dent and Nielsen both teach an amplifier circuit for use in radio transmitters thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the amplitude feedback loop, phase lock loop, and coupler taught in Nielsen in the amplifier circuit of Dent for the purpose of improving the phase linearity as well as the amplitude linearity of the amplifiers of Dent thus creating lower levels of spurious signals as taught by Nielsen.

Dent in view of Nielsen does not teach a dipole antenna.

Wallace teaches a dipole antenna (Figure 6, Column 4 line 3).

Dent (Column 1 lines 29 – 34, the amplifier circuit can be used in radiotelephones or base stations) in view of Nielsen and Wallace teach a

radiotelephone thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the dipole antenna taught in Wallace on the radiotelephone of Dent in view of Nielsen for the purpose of creating a symmetric radiation pattern thus allowing said radiotelephone to receive and transmit signals from and in all directions.

Regarding Claim 17, Dent in view of Nielsen and in further view of Wallace teaches all of the claimed limitations recited in Claim 16. Nielsen further teaches a phase error detector which is adapted to provide a phase error signal according to an input signal and the output signal; and a signal generator to generate a envelope signal according to the phase error signal (Figure 1, Column 7 lines 15 – 44, the difference (Dp) is the phase error signal).

Regarding Claim 18, Dent in view of Nielsen and in further view of Wallace teaches all of the claimed limitations recited in Claim 17. Nielsen further teaches an amplitude error detector to provide an amplitude error signal according to the input signal and the output signal (Figure 1, Column 7 lines 66 – 67, Column 8 lines 1 – 21, the amplitude error signal is (Da)); and a control signal generator to generate first and second control signals according to the amplitude error signal, wherein the first control signal is determined, at least in part, by the amplitude error signal (Column 7 lines 66 – 67, Column 8 lines 1 – 21, the signal Da is also the control signal) and the second control signal is determined, at least in part, by an adaptive function of the amplitude error signal (Figure 2, Column 9 lines 61 – 65, the gain control signal (Ga) is a second control signal that is derived from the difference signal (Da)).

Regarding Claim 19, Dent in view of Nielsen and in further view of Wallace teaches all of the claimed limitations recited in Claim 18. Nielsen further teaches wherein the first and second control signals are adapted to vary amplitudes of signals at a first range of the amplitude error signal (Column 8 lines 1 – 21, Column 9 lines 61 – 65, the difference Da is the range, the control signals Ga are directly proportional to the difference Da thus Ga will be adapted to vary the amplitudes at a difference Da) and to vary a phase difference of signals at a second range of the amplitude error signal (Column 7 lines 15 – 44, Column 7 lines 66 – 67, Column 8 lines 1 – 21, Column 9 lines 61 – 65, the phase difference (Dp) can vary for any amplitude difference (Da) since the phase is controlled by a separate phase lock loop, Ga is directly proportional to Da thus Ga can be adapted over various amplitude differences). Dent further teaches varying an amplitude of the output signal by varying a phase difference between the first and the second outphased signals (Figure 2, Figure 3, Column 2 lines 56 – 61, Column 6 lines 66 – 67, Column 7 lines 1 – 4, Column 7 lines 59 – 67, Column 8 lines 1 – 2, the out-phased signals are 306 and 308, Dent teaches a modern day implementation of outphasing modulation, the outphasing modulation method taught by Dent comprises an adaptive method that combines two outphased signals with a variable phase difference such that the phases of said signals add and cancel in phase, the addition and subtraction in phase thus produces an output signal with a varying amplitude)

Regarding Claim 20, Dent in view of Nielsen and in further view of Wallace teaches all of the claimed limitations recited in Claim 16. Dent further teaches first and second power amplifiers which are adapted to amplify the first and the second out-

phased signals (Figure 3, the out-phased signals are 306 and 308, the amplifiers are 312 and 314); and a combiner which is adapted to combine the first and the second amplified out-phased signals (Figure 3, Column 8 lines 38 – 41).

Regarding Claim 21, Dent in view of Nielsen and in further view of Wallace teaches all of the claimed limitations recited in Claim 20. Nielsen further teaches wherein the targeted power level is to be selected from first and second power levels (Column 8 lines 1 – 21, Column 10 lines 27 – 29, the amplitude feedback loop maintains amplitude linearity thus allowing for various desired power levels to be selected).

## *Conclusion*

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond S Dean whose telephone number is 703-305-8998. The examiner can normally be reached on 7:00-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay A Maung can be reached on 703-308-7745. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond S. Dean
March 18, 2005

NAY MAUNG
SUPERVISORY PATENT EXAMINER